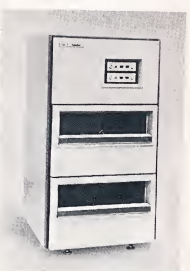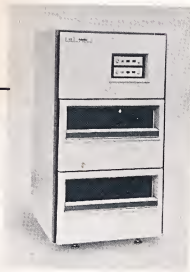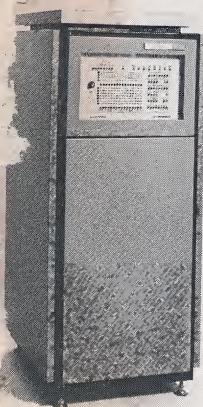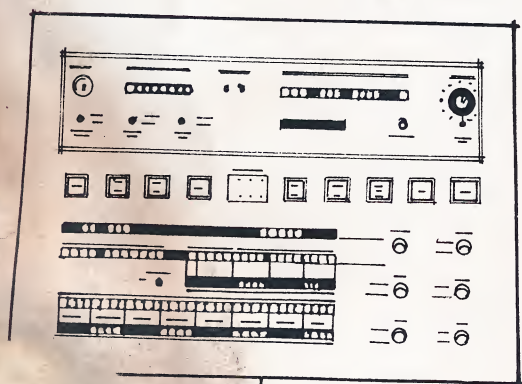# TELEFILE DS-32-X DISK FILE SYSTEM FOR XEROX COMPUTERS

XEROX SIGMA 9

Nov 75

A completely integrated disk file system with a capacity of up to 464M bytes.

The Telefile DS-32-X is an integrated disk file system consisting of a Telefile disk controller, one or more Telefile single- or double-density, moving-head, removable-media disk drives, one or more disk packs, a software transparent program for transferring stored data to and from the computer, plus a disk system diagnostic program.

The DS-32-X is compatible with Xerox computer systems, SIGMA 3 through 9 and Xerox 550 and 560. Full advantage is taken of the SIGMA computer data-transfer techniques. Data is transferred from the SIGMA IOP via a Telefile-modified 7902 Device Subcontroller, on a one-byte or optional four-byte basis. The transfer rate is 312K bytes per second, with Rotational Position Sensing to speed data retrieval.

EXPANDABILITY—The DS-32-X system consists of up to 8 single- or double-density disk packs for a total potential capacity of up to 464 million 8-bit bytes. Single- and double-density disk packs can be intermixed in any ratio. Switches on the controller panel are used to select either 203 (single-density) or 406 (double-density) cylinder operation.

COMPATIBILITY—The DS-32-X is plug-compatible and can serve as a direct replacement for Xerox-supplied disk systems. The Telefile system is transparent to such Xerox software as RBM, CP-V, BPM, CP-R, UTS and others. With one Telefile DD-114 disk drive, the system corresponds to the Xerox Model 7240 disk controller with one Model 7246 disk storage unit. With two DD-114 disk drives, it corresponds to the Xerox Model 7240 disk controller with one Model 7242 disk storage unit. With one DD-215 disk drive unit, it corresponds to the Xerox Model 7270 system. Add-on DD-213 and DD-215 disk drives correspond to one and two Xerox Model 7271 disk drives, respectively. The controller maintenance/indicator panel color matches the Xerox computer grey; the balance of the cabinet is blue to coordinate with the disk drive unit(s).

MULTIPLE RECORD TRANSFERS—A single command from the computer can initiate transfer of single or multiple records. The result is a sharp reduction in the software overhead. Moreover, a 32-byte buffer memory, contained within the controller, minimizes the danger of overruns and data loss.

BUILT-IN POWER SUPPLIES—The disk file system controller and drives have their own built-in power supplies, connected directly to 115 VAC and 208/230 VAC line voltages, respectively. There is no drain on the SIGMA computer power supply. An optional DC Power Monitor circuit limits the loss of data when voltage levels depart from norm.

MAINTAINABILITY—Stand-alone controller cabinet, separate disk drive drawers, plug-in circuit boards, and a maintenance/indicator panel assure a high level of reliability and ease of maintenance. A disk-system test/exercisor program, supplied by Telefile, can be added to the SIGMA computer diagnostic file. In addition, the system can run Xerox diagnostics, including System EXerciser (SEX).

Telefile
COMPUTER PRODUCTS, INC.

MODEL DS-32-X DISK SYSTEM SPECIFICATIONS

COMPUTER INTERFACE	SIGMA 3, 5, 6, 7, 8 or 9 and XEROX 550, 560
DISK PACK	Telefile DP-216 or DP-216D
DISK PACKS PER DRIVE UNIT	1 or 2
DISK PACKS PER SYSTEM	8, maximum
DENSITY	Single or double (in any ratio)
CAPACITY	Per single-density disk pack: 29M bytes (24.9M data bytes) Per double-density disk pack: 58M bytes (49.9M data bytes) Per system: up to 464M bytes (399M data bytes)
DATA TRANSFER RATE	312K bytes per second
RECORD LENGTH	1024 bytes standard
SECTORS (RECORDS) PER TRACK	6, standard
OPERATIONAL COMMANDS	10
MAINTENANCE/INDICATOR PANEL	Exercises all controller functions off-line; may be used to format disk pack
ROTATIONAL SPEED	2400 RPM ± 2%
ROTATIONAL LATENCY	12.5 milliseconds, average 25 milliseconds, maximum
HEAD POSITIONING TIME	10 milliseconds, track to track, 55 milliseconds, full stroke
RECORDING SURFACES PER DISK PACK	20
NUMBER OF TRACK POSITIONS	Single density disk pack: 30 Double density disk pack: 406

	CONTROLLER	DRIVE UNIT D-216*
VOLTAGE	115 VAC ± 10%, single phase	208/230 VAC ± 10% 3 phase
FREQUENCY	50/60 Hz	60 ± 0.5 Hz 50 ± 0.5 Hz optional
CURRENT	4 amps	Start: 20 amps (for 7 seconds per disk pack Run: 4.3 amps per disk pack
DIMENSIONS	Height: 60.50" Width: 25.50" Depth: 34.50"	Height: 60.50" Width: 32.00" Depth: 32.25"
WEIGHT	250 lbs. (approx.)	800 lbs. (approx.)

*See appropriate data sheets for other disk drive specifications.

CONTROLLER AND DISK DRIVE SELECTION

The DS-32-X system controller recognizes an I/O address in the range of 8 through F. Disk-drive addresses are in the range of 0 through 7. A drive is selected by an I/O instruction that contains both the controller address and a drive address.

STATUS TRANSFERS

The DS-32-X system controller responds to SIGMA I/O instructions with the status information listed to the left.

OPERATIONAL COMMANDS

The operational commands listed to the left are transmitted in response to a service request from the controller to the SIGMA IOP. The service request automatically follows an SIO instruction, or occurs during a command chain operation.

STATUS RESPONSE TO SIO, HIO, AND TIO

BIT	FUNCTION
0	Interrupt Pending
1,2	Drive Condition
3	See Automatic or Manual Mode
4	Abnormal End
5,6	DC-32-X Condition
7	Unassigned

STATUS RESPONSE TO TDV

BIT	FUNCTION
0	Data Overflow
1	Flaw Mark
2	Sector Unavailable
3	Write Protect Error
4	Header Verification Error
5	On Cylinder
6	Seek Timeout Error
7	Header Parity Error

STATUS RESPONSE TO AIO

BIT	FUNCTION
0	Data Overflow
1-3	Unassigned
4	On-Sector Interrupt

BIT	FUNCTION
5	On Cylinder
6	Seek Timeout Error
7	Unassigned

OPERATIONAL STATUS

BIT	FUNCTION
0	Transmission Data Error
1	Length Error
2	Chaining Modifier
3	Channel End
4	Abnormal End
5-7	Unassigned

OPERATIONAL COMMANDS

COMMAND	CODE (HEX)
Write	01
Read 2	02
Seek	03
	or 83-Seek with interrupt
Sense	04
Write Check	05
Header Write	09
Header Read	0A
Read 1	12
Release	23
Restore Carriage	33
	or B3-Restore with interrupt

Telefile
COMPUTER PRODUCTS, INC.

17131 Daimler Street, Irvine, California 92705, Telephone (714) 557-6660

TELEFILE T-8000 SERIES MAIN MEMORY FOR XEROX COMPUTERS

Efficient, economical, reliable Xerox compatible replacement, add-on and extension core memory systems.

The Telefile T-8000 Series Main Memory is a completely compatible add-on memory system for the Xerox and Sigma computer systems. The main memory of the Xerox/Sigma computer can be replaced, expanded and even extended beyond previous design limits using the Telefile system.

The system offers a full six-port interface capability (12-port for Sigma 8 and 9) without the costly port expansion feature. Interleave options of 2- and 4-way are selectable by a simple switch setting.

EXPANDABILITY—Each memory bank contains 16K words and can be expanded to 32K by adding a 16K word increment. Each Telefile memory cabinet can accommodate any configuration of from 16K to 96K words. Multiple cabinet configurations enable virtually unlimited system expansion.

VERSATILITY—The T-8000 Series Main Memory can be configured to start from any address and end at any address in 16K word increments. Address ranges between 16K segments do not need to be consecutive.

COMPATIBILITY—Telefile memory can be attached directly to the CPU, or it may be daisy chained from the resident Xerox/Sigma memory using the standard Xerox cables and interface scheme. The system is completely compatible with all existing Xerox computer software and diagnostics. No modifications of any kind are required.

BUILT-IN POWER SUPPLY—Each T-8000 Series Main Memory cabinet has its own built-in power supply which operates on 208 or 230 VAC, 3 phase 50 or 60 Hz line voltage. There is no drain on the CPU power supply.

MAINTAINABILITY—The T-8000 Series Main Memory is housed in a stand-alone cabinet unit with an internal maintenance panel for each bank. Modular design and plug-in assemblies allow rapid fault isolation and component replacement.

Telefile
COMPUTER PRODUCTS, INC.

T-8000 SERIES SYSTEM SPECIFICATIONS
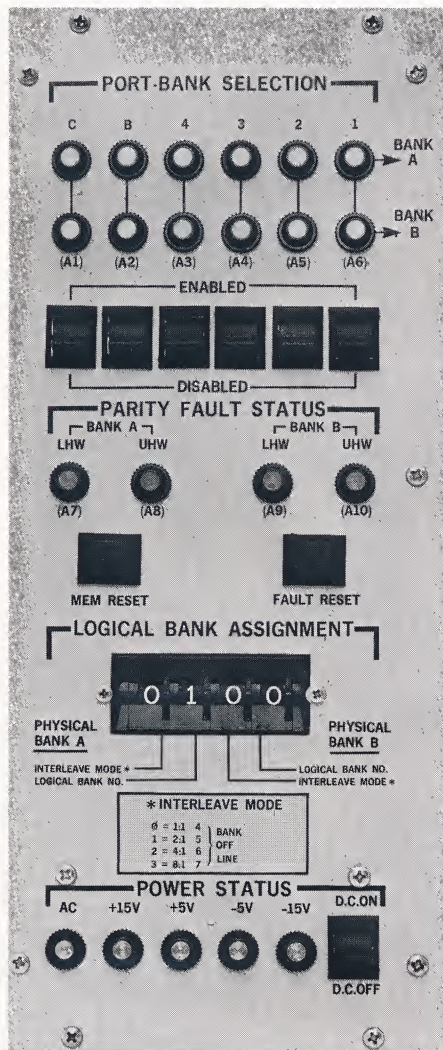
**T-8000 Series
Memory Maintenance
Panel**

SYSTEM CAPACITY:	From 16K words to 96K words in a single space saving cabinet.
BANK CAPACITY:	16,384 words of 32 bits per word plus parity.
PORT CONFIGURATION:	From 1 to 6 ports per bank (12 ports for Sigma 8 and 9) without a port expansion feature.
INTERLEAVING:	Easy to operate front panel switch settings allow selection of no interleave, 2-way or 4-way interleaving.
CABINET SIZE:	60½″ high, 25″ wide, 34½″ deep. Can contain up to 96K words with 6 to 12 ports per bank.
VOLTAGE REQUIREMENTS:	208 or 230 Volts AC, 50 or 60Hz at 15 Amps.
INTERFACE:	Complete timing and electrical compatibility with existing Xerox and Sigma interfaces.
RELIABILITY:	Uses efficient high reliability planar core memory modules with integrated circuit logic elements.
MAINTAINABILITY:	Simple modular construction allows rapid fault isolation. Plug in assemblies allow rapid spares replacement. Port, bank and system downgrade switches, plus bank assignment switch programming, allow rapid reconfiguration.
SOFTWARE, DIAGNOSTICS:	The system is completely compatible with all existing Xerox computer software and diagnostics. No modifications are required.
TIMING:	Access and cycle time specifications meet or exceed those of the equivalent Xerox memory.

TELEFILE T-7100 SERIES CARD READER SYSTEMS FOR XEROX COMPUTERS

A complete family of versatile, high-performance card reader systems with broad features and capabilities.

The Telefile T-7100 Series Card Readers are completely compatible data card input systems specifically designed for Xerox and Sigma computers. Each is a complete system with all interface and control electronics to connect directly to the Xerox/Sigma input/output processor.

The Telefile T-7100 Series Card Readers include 21 different models, in desk-top and console configurations, with card processing rates of from 200 to 1,500 cards per minute. The card reader controller, included with each system, is available in two configurations—a rack-mounted card file chassis to mount inside the Xerox cabinet, and a single-card module to mount inside a Telefile cabinet.

The controller includes a Xerox 7902 device subcontroller and it interfaces with the Xerox MIOP via the standard Xerox I/O cables and interface scheme. Having, essentially, a Xerox-to-Xerox interface, the Telefile T-7100 systems are completely plug-to-plug compatible with all Xerox hardware and fully transparent to all Xerox software, including the RBM, BTM/BPM, UTS, CP-5 and CP-R operating systems.

VERSATILITY—Nine models have the added versatility of an optical mark read station that enables the same reader to process both punched cards and pencil-marked cards; an effective and simple method of adding mark-sense applications to your data processing system.

RELIABILITY—Telefile T-7100 card readers may be configured with an optional double-read capability to virtually eliminate read errors. When this option is configured, each card is read twice; once by each of two different read stations. The read data is then compared, and if it is not the same, it will never get to your CPU.

DEPENDABILITY—The Telefile card readers are high-quality, heavy-duty devices that have set the industry standard for ruggedness and dependability. Each unit offers a unique marriage of precision card-handling mechanisms and efficient infrared light-emitting-diode/photo-transistor read systems. The readers have a straight-through card track that is inherently jam resistant, since only one card is in the track at a time. The sophisticated vacuum picker mechanism used on all models will handle severely damaged cards and prevent double picking, even if two cards are stapled together.

Telefile card reader models and processing rates are shown below.

READER MODEL	CARD RATE
T-7121	200 cpm
T-7119, T-7120	285 cpm
T-7124, T-7125	300 cpm
T-7122, T-7123, T-7170	400 cpm
T-7128, T-7129, T-7130, T-7131	600 cpm
T-7132, T-7133, T-7134, T-7135	1,000 cpm
T-7136, T-7137, T-7138, T-7139	1,200 cpm
T-7140	1,500 cpm

Telefile
COMPUTER PRODUCTS, INC.

T-7100 SERIES CARD READER SPECIFICATIONS

GENERAL SPECIFICATIONS

CARD TYPE	Standard 80-column card
LIGHT SOURCE	Infrared light emitting diode
READ STATIONS	Photo transistor, 12 bits parallel
ELECTRONICS	TTL integrated circuit logic
INTERNAL CLOCK	Crystal oscillator
AC POWER	115/230 VAC ±10%, 60/50 Hz±2 Hz
DC POWER	±8 VDC +4 VDC

MODEL SPECIFICATIONS

MODELS T-7119, T-7120, T-7121

CHASSIS CONFIGURATION	Desk-top
HOPPER/STACKER CAPACITY	550 cards
READ SYSTEM	T-7119, T-7121 punched card; T-7120 punched card and mark-sense
HEIGHT	11 inches
WIDTH	19¼ inches
DEPTH	14 inches
WEIGHT	60 pounds
POWER	1,650 VA starting, 570 VA running

MODELS T-7130, T-7131, T-7134, T-7135

CHASSIS CONFIGURATION	Console
HOPPER/STACKER CAPACITY	1,500 cards
READ SYSTEM	T-7130, T-7134 punched card; T-7131, T-7135 punched card and mark-sense
HEIGHT	43 inches
WIDTH	22⅞ inches
DEPTH	26¾ inches
WEIGHT	160 pounds
POWER	2,760 VA starting, 1,070 running

MODELS T-7122, T-7123, T-7124, T-7125, T-7128, T-7129, T-7132, T-7133, T-7136, T-7137

CHASSIS CONFIGURATION	Desk-top
HOPPER/STACKER CAPACITY	1,000 cards
READ SYSTEM	T-7122, T-7124, T-7128, T-7132, T-7126 punched card; T-7123, T-7125, T-7129, T-7133, T-7137 punched card and mark-sense
HEIGHT	16¼ inches
WIDTH	23-1/16 inches
DEPTH	18 inches
WEIGHT	75 pounds
POWER	1,650 VA starting, 600 VA running

MODELS T-7138, T-7139, T-7140

CHASSIS CONFIGURATION	Console
HOPPER/STACKER CAPACITY	2,500 cards
READ SYSTEM	T-7138, T-7140 punched card; T-7139 punched card and mark-sense
HEIGHT	37⅞ inches
WIDTH	23½ inches
DEPTH	37¼ inches
WEIGHT	200 pounds
POWER	2,760 VA starting, 1,070 VA running

MODEL T-7170 READER/PUNCH

CHASSIS CONFIGURATION	Console
HOPPER/STACKER CAPACITY	1,000 cards
READ SYSTEM	Punched card
HEIGHT	49-9/16 inches
WIDTH	41-1/16 inches
DEPTH	19-1/16 inches
WEIGHT	207 pounds
POWER	1,012 VA running

Telefile
COMPUTER PRODUCTS, INC.

TELEFILE LINE PRINTERS FOR XEROX AND SIGMA COMPUTERS

A complete family of versatile, high performance buffered line printer systems with a wide selection of features and capabilities.

The Telefile line printers are completely compatible hardcopy output systems specifically designed for Xerox and Sigma computers. Each is a complete system with all interface and control electronics to connect directly to the Xerox/Sigma input/output processor.

The Telefile family of line printers includes 14 different models with printing rates of from 240 to 1,500 lines per minute. The line printer controller, included with each system, is available in two configurations—a rack-mounted card file chassis that can be installed in the standard Xerox cabinet or a Telefile cabinet, and a single-card module to mount inside a Telefile cabinet.

The model T-7460, pictured, provides extremely high quality output that duplicates the performance of the previously incomparable IBM 1403. Its unique friction-free, horizontally-moving, character band produces crisp, clear characters in perfectly straight, even lines at the rate of 1,500 lines per minute. (A power stacker is standard to keep you from being buried by the output.) The T-7460 offers an unparalleled blend of IBM 1403 performance, Xerox/Sigma compatibility and Telefile price/delivery/service to enhance all your printing applications, from mailing labels to high-quality form letters and mailers.

The Telefile line printer controller includes a Xerox device subcontroller, and it interfaces with the Xerox input/output processor via standard Xerox I/O cables and interface scheme. Having, essentially, a Xerox-to-Xerox interface, the Telefile line printers are completely plug-to-plug compatible with all Xerox hardware and fully transparent to all Xerox software, including the RBM, BTM/BPM, UTS, CP-V and CP-R operating systems.

VERSATILITY—Each Telefile line printer offers a large assortment of options that allows you to select the features you need to fulfill your exact system requirements. Most popular options include: character set memory, code conversion and changeable fonts to enhance system flexibility, and self-test, parity check and hammer verification features to improve reliability.

RELIABILITY—All models are equipped with a highly reliable one-piece friction-free print hammer that provides unsurpassed line straightness and print clarity. This assembly has a demonstrated life expectancy of over 500 million operations.

MAINTAINABILITY—Modular design concepts are utilized throughout all mechanical and electronic assemblies to enable rapid fault isolation and repair. The inherent stability of the printer subsystems assures long-term trouble-free operation with minimal preventive maintenance.

Telefile line printer models and processing rates are shown below.

PRINTER MODEL	SPEED	PRINTER MODEL	SPEED
T-3462	240 lpm	T-3463, T-7463	600/700 lpm
T-7450	245 lpm	T-7441	820 lpm
T-3461	300 lpm	T-3466	925 lpm
T-3464, T-7464	500 lpm	T-7446	1,200 lpm
T-7442	550 lpm	T-3465	1,250 lpm
T-7440	600 lpm	T-7460	1,500 lpm

Telefile
COMPUTER PRODUCTS, INC.

LINE PRINTER SPECIFICATIONS

GENERAL SPECIFICATIONS

PAPER TYPE	Single copy, 15 lb. bond minimum. Multi-copy up to six parts, 12 lb. bond with single-shot carbon.
CHARACTER FORMATS	132-136 columns
AC POWER	110/230 VAC ±10%, 60/50 Hz ±2 Hz
DC POWER	±8VDC +4 VDC
TEMPERATURE	Operating: 50°F to 110°F Nonoperating: 0°F to 150°F
HUMIDITY	Operating: 30% to 80% (w/o condensation) Nonoperating: 0% to 95% (w/o condensation)
I/O INSTRUCTIONS	SIO, Start Input/Output HIO, Halt Input/Output TIO, Test Input/Output TDV, Test Device AIO, Acknowledge I/O Interrupt
ORDER CODES (HEX)	01—Print a Line 03—Format 05—Print with Format 41—Print and Interrupt on Data Transmission Completed 43—Format and Interrupt on Data Transmission Completed 45—Print with Format and Interrupt on Data Transmission Completed
FORMAT CONTROL CODES (HEX)	60, E0—Inhibit Automatic Space after Print 40, C0—Space 0 lines (normal spacing) C1—Space 1 line C2—Space 2 lines C3—Space 3 lines C4—Space 4 lines C5—Space 5 lines C6—Space 6 lines C7—Space 7 lines C8—Space 8 lines C9—Space 9 lines CA—Space 10 lines CB—Space 11 lines CC—Space 12 lines CD—Space 13 lines CE—Space 14 lines CF—Space 15 lines F0—Skip to Channel 0 (bottom of page) F1—Skip to Channel 1 (top of page) F2—Skip to Channel 2 F3—Skip to Channel 3 F4—Skip to Channel 4 F5—Skip to Channel 5 F6—Skip to Channel 6 F7—Skip to Channel 7

MODEL SPECIFICATIONS

MODEL T-7460

PRINTER TYPE	Character Band
PRINT RATE	1,500 lpm
CHARACTER FORMAT	48-character ASCII
PAPER DIMENSIONS	Standard fanfold, 5 inches to 18¾ inches wide
HEIGHT	46 inches
WIDTH	48½ inches
DEPTH	48½ inches with power stacker
WEIGHT	950 pounds with power stacker
AVAILABLE OPTIONS	Character Set Memory, Hammer Verification Check, Alternate Fonts

MODELS T-3461, T-3462, T-7450

PRINTER TYPE	Drum
PRINT RATE	T-3461, 300 lpm; T-3462, 240 lpm T-7450, 245 lpm
CHARACTER FORMAT	T-3461, 64-character ASCII T-3462, 95- or 96-character ASCII T-7450, 64-character modified ASCII
PAPER DIMENSIONS	Standard fanfold, 4 inches to 16¾ inches wide
HEIGHT	45 inches
WIDTH	33 inches
DEPTH	22 inches
WEIGHT	340 pounds
AVAILABLE OPTIONS	Vertical Format Unit, Alternate Fonts, Static Eliminator, Paper Receptacle, Elapsed Time Meter, Long Line Interface

MODELS T-3463, T-3464, T-7440, T-7463, T-7464

PRINTER TYPE	Drum
PRINT RATE	T-3463, T-7463, 600/700 lpm; T-3464, T-7464, 500 lpm; T-7440, 600 lpm
CHARACTER FORMAT	T-3463, T-7463, 64-character ASCII T-3464, T-7464, 95- or 96-character ASCII T-7440, 56- or 64-character ASCII
PAPER DIMENSIONS	Standard fanfold, 4 inches to 16¾ inches wide
HEIGHT	45 inches
WIDTH	33 inches
DEPTH	25 inches
WEIGHT	370 pounds
AVAILABLE OPTIONS	Vertical Format Unit, Alternate Fonts, Static Eliminator

MODELS T-3465, T-3466, T-7441, T-7442, T-7446

PRINTER TYPE	Character Band
	T-3465, 1,250 lpm; T-3466, 925 lpm; T-7441, 820 lpm; T-7442, 550 lpm; T-7446, 1,200 lpm
CHARACTER FORMAT	T-3465, T-446, 64-character, ASCII T-3466, 95- or 96-character ASCII T-7441, 64-character EBCDIC T-7442, 91- or 96-character modified EBCDIC
PAPER DIMENSIONS	Standard fanfold, 5 inches to 18¾ inches wide
HEIGHT	46 inches
WIDTH	48½ inches
DEPTH	24½ inches
WEIGHT	800 pounds
AVAILABLE OPTIONS	Character Set Memory, Hammer Verification Check, Self Test, Alternate Fonts, Power Stacker

Telefile
COMPUTER PRODUCTS, INC.
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One of our marketing thrusts is to design and produce a large variety of disk memory systems for non-IBM computers with over 20 different interfaces presently available.

Our other marketing thrust is in the field of data communication systems, supplying highly price-competitive plug-compatible replacements for IBM communications equipment as well as systems that offer the user performance advantages over IBM.
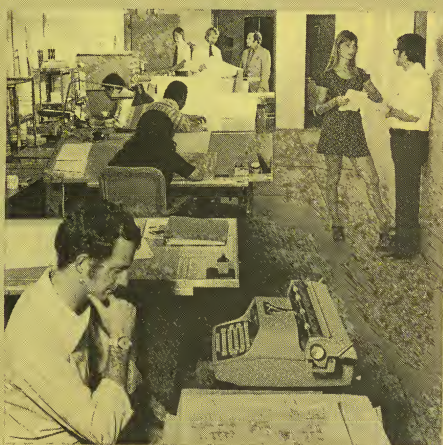
To meet the needs of the marketplace and to help give us a competitive edge, we strive to provide quick turnaround capability. As a result, we've become basically engineering oriented with an extensive engineering capability. With this orientation in mind we laid out the engineering portion of our facility to help create an informal, relaxed atmosphere, conducive to the free interplay and exchange of ideas and information.

Unlike many less established firms who find it advantageous to job out their drafting and PC board layouts, our continuing production requirements require a full-time in-house drafting staff.

PC boards and metal work are purchased in sufficient quantities from top quality vendors to obtain them at economical prices. All circuit board component mounting and soldering is performed in clean, well-lighted areas of our production department.

Inanimate assemblies are brought together in our test area where life is "breathed" into the complete system. Each different computer our equipment interfaces with has its own quirks and idiosynchrosies, so it is critical that our products are able to accomodate them. To prove our equipment's ability to do this in the field, we developed a series of special computer simulators to help us in our test area.

Once the circuit boards and assemblies are completed, they are rigidly inspected to Telefile and customer drawings by our dedicated Quality Assurance inspectors. This tenacious attention to detail and our motivation to "do the job right the first time" have a great deal to do with the exceptionally low downtime experienced by our customers in the field once the equipment has been delivered and accepted.

Our final checkout is where disk drives are tied together with one of our controllers into a complete disk memory system. The system is then test operated from a panel that has the capability of simulating a wide variety of CPUs. There are times, however, when we find it necessary or desirable to actually check out our disk system with the customer's own computer or a nearly identical twin, prior to shipment. In this case we have three alternatives:

One is to ship the disk system to the customer's site accompanied by Telefile personnel. Here we check it out to the customer's satisfaction—something we normally do anyway.

A second alternative is to have the customer's newly ordered CPU dr... ...ipp...d by its manufacturer to our fa... interfacing and checkout wit... system. Then the complete s... shipped to the customer.

A third alternative is for us... tage of the proximity of nea... of California at Irvine, with... computer facility. We check o... systems during their off-hours... chasing time on different typ... puters utilized there.

As mentioned earlier, custome... an extremely important part o... keting effort. Every piece of equ... we ship is accompanied by a co... sive set of maintenance docume... including complete logic diagram... diagnostic programs. The detail... documentation is exceeded onl... very largest firms with substantia... mentation staffs. Documentation for... existing disk controllers is readily available and for newly designed controllers requires usually less than 90 days to publish.

And because our customers' needs vary, we offer complete flexibility in the way of maintenance services. For instance, if... the customer wishes to perform his own maintenance, we will train his people in our school here—or even at his site if desirable. We also provide full on-site maintenance contract services, "by the call" servicing, or any other type of arrangement the customer desires.

To complete our tour, we'd like to briefly touch on some of our products which are shown and described on the reverse side of the right hand flap and the back cover.

THROUGH THESE PORTALS

Employees, products, investors and suppliers have been
the keys to Telefile's success since its inception
in 1968. Along with them goes the very best service obtain-
able at any cost. With these resources, Telefile customers
around the world are assured of timely delivery of disk
memory systems and computer data communication systems
laden with features, highly competitive in price, and unsur-
passed in value. Customers are also assured of complete
system design, documentation, on-site training (where
applicable), programming, and maintenance support.

A large part of Telefile's business is large data storage,
moving head disk memory systems. Telefile meets user
needs in this area by interfacing IBM compatible type disk
drives with over 20 of our proprietary controllers, enabling
them to operate with virtually every non-IBM computer.

A second, and growing part of our business is providing
users with computer data communication systems. This is a
field which is growing explosively as increasing numbers of
dedicated and dial-up telephone lines are utilized to provide
long and short distance computer-to-computer and terminal-
to-terminal computer data transmission at high speed and
low cost. Our basic capability here consists of multiplexors,
remote job entry systems, data concentrators, data trans-
mission control units, and front end processors. In fact, it
includes almost everything associated with data communi-
cations, with the exception of modems, host computers and
telephone lines.

Telefile Application Profiles

billions of dollars in busi-
...ons per year are consumat-
...lefile's TCP-64 Front-End
...ications Network Control
... world's largest com-
...ing market. For several
...ess transactions that include
...uch commodities as wheat,
...oybean complex, iced
...rs, plywood and silver have
...d by this system.

...s occuring in trading "pits"
...d in by operators on the keyboards
...220 BAUD Ultronics CRT
... This information is then sent
...he Telefile TCP-64 system,
...cts as a front-end processor for the
...t computer, an IBM 370/145.
...t information is acted upon by
...nputer and software with updated
...otations on Ferranti-Packard wallboards,
...rming continuous displays encircling
...e trading floor, RCA 880 BAUD closed
circuit digital-to-video TV monitors at
various exchange locations, and a network
of 5-level baudot ticker tapes located
throughout the world. Each transaction
from trading "pit" terminal to output de-
vice takes place in less than one second, as
up to 160 trades per minute without inter-
ruption are demanded for continuous
reliability of the TCP-64 is of significant
importance.

With its inherent dependability and speed
accented by direct memory access and a
16 interrupt structure (expandable up
to 64) the Telefile TCP-64 is ideal for the
exchange's applications. In addition, it
handles the multiple BAUD rate require-
ments dictated by the various input and
output devices by allowing for the selection
of transmission speeds in the software.
Flexibility is further increased by software-
selectable assignment of commodities to
the Ferranti-Packard wallboards.
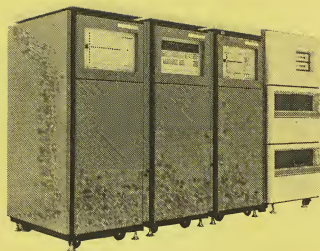
For a major governmental agency, the
Telefile TCP-64-4 Synchronous High
Speed Programmable Communication
System (including a Telefile provided
ASR 33 TTY) is in use as a data concen-
trator and store and forward system.
A communication breakthrough,
the TCP-64-4 allows communications
with remotely located terminals and
computer systems on each of its
16 lines at rates of up to 50 K BAUD.
This permits a concentration of a variety
of remote job entry terminals into one
or more high speed synchronous
lines, increasing line utilization and
thereby reducing substantially line ren-
tal costs.

Unique with the TCP-64-4 is a Mini-HASP
Concentrator/Store and Forward
Software Package that is transparent to
multi-leaved IBM 360/20 type terminals
and which serves to enhance other IBM
compatible remote job entry terminals
by providing multi-leaving and data
compression. The other terminals con-
nected through the TCP-64-4, such as
IBM 2780's, IBM 3780's, Data 100's,
and Remcom terminals, are also
supported by this feature-laden software.
To the terminals, the TCP-64-4 "appears"
as an IBM HASP access method, thereby
eliminating major changes in software.
Furthermore, the software is provided
with automatic remote bootstrap
loading capabilities for unattended
operation of the data concentrator.

The TCP-64-4 utilizes a Telefile S-16
Communications Subsystem as the
high speed line scanner between the re-
motely located terminals and the TCP-64-4
Communications Processor. Eliminating
the throughput limitations of con-
ventional data cencentrators, the S-16
performs the character-by-character
processing in firmware and assembles
the data into the 16-bit, 1 microsecond
(cycle time) communications processor
buffered expandable memory through
a direct memory access (DMA) port.
Additionally, the S-16 provides CRC
checking, handles code transparency,
has a communication control language
that is applicable to USASCII or EBCDIC
and performs other tasks available in
the IBM bi-synchronous protocol.

As data is received from the lower speed
terminals, it is then transmitted through
a Telefile controller and stored on
Telefile's DD-213 58 million 8-bit byte
Disk Drive. Upon completion of this
operation, an IBM 360 or 370 computer
located several hundred miles away, is
dialed and then sent the information
on a 50K BAUD bi-sunchronous line.
The computer then transmits its response
back over the 50 K BAUD line into
the DD-213 Disk Drive, where the data
is then stored until the appropriate re-
mote terminal is ready to receive the
data. Should additional disk memory be
needed for the system, up to seven
additional double-density spindles
(58 million bytes each) may be connected
through the controller for more storage
than most applications demand.
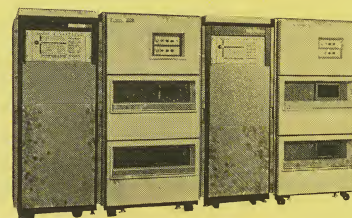
This system is representative of the Telefile
disk memory equipment in operation at
a non-profit, independent Mid-western
corporation. Approximately half a million
information requests and additions are handled
daily through the corporation's sophisticated
system, of which the Telefile system serves
as a data base of library information. The
almost 600 million 8-bit bytes of on-line
memory storage is provided by two Telefile
Disk Drive Controllers and ten Telefile DD-215
Disk Drive Unit spindles (of which four
spindles are shown, two spindles per unit).

Public and university librarians all across the
United States and Europe gain access to
descriptive information on thousands of in-
dividual books via a network of remote 2400
BAUD CRT stations. Transmitting over
one of several leased multi-drop type commu-
nication lines through a communications
interface to a bank of XDS Sigma 5 computers,
these stations request and receive in a
matter of seconds and even fractions of seconds
desired data from the Telefile Disk Memory
System. Upon completion of the transaction,
an automatic sequence is employed to print
(in pre-determined format), pre-sort, and
alphabetize the library filing cards, which are
then mailed to the librarian for filing. If infor-
mation on the requested book(s) is not a
present part of the data base, the librarian
determines what it should be and enters it
into the data base. These updates, along with
Library of Congress additions and various
other sources' additions, insure that the data
base is as up-to-date as feasibly possible.
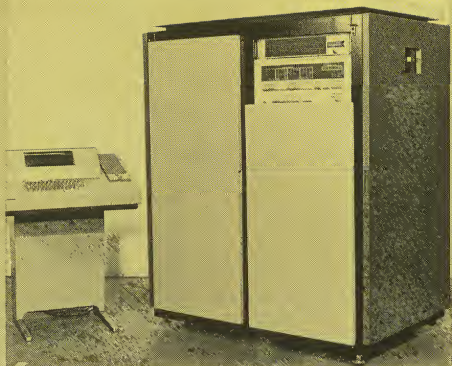
The versatility of the Telefile TCP-64 Data Communication System makes it ideal for use in many fields. For instance, a large retail department store chain, headquartered in Southern California, uses the programmable TCP-64 with several synchronous and asynchronous lines to interface its automatic credit verification and point-of-sale systems to an IBM 370/145.

Supplied with an ASR TTY, the TCP-64 interfaces several terminals and terminal systems to the computer system. For automatic credit verification, terminals at local stores are connected through a TRW System 4000 to the computer. This is made possible through the TCP-64, which enables the TRW System 4000 to "appear" as a standard IBM 2260 intelligent terminal. As terminal software for the 2260 is readily available from IBM, the expense of developing new software is eliminated.

With a one-microsecond cycle time and six-microsecond interrupt communication processor, the TCP-64 also interfaces several centrally located Courier 2260 Type CRT terminals which request and display information concerning customer accounts. Special Telefile developed terminal handler software provides for hard copy printouts of this information by enabling five NCR 260 thermal printers to connect through the Telefile TCP-64 to the computer.

Nuclear structure research is conducted through a Telefile DC-32 Disk Memory System in operation with an XDS Sigma 7 complex at a major university cyclotron laboratory in the Great Lakes region. Here analog detectors pick up information on nuclei collisions with the cyclotron accelerator and transmit the data through analog-to-digital converters to the computer system. As the information is of substantial size, it is then directed through the Telefile DC-32 Disk Drive Controller and transmitted at 312,000 8-bit bytes per second to and from the four Telefile DD-215 Disk Drive Unit double-density spindles, where it is stored for subsequent analysis.

Interfacing the almost 200 million bytes of disk memory to the Sigma 7 computer through a Telefile modified XDS 7902 device subcontroller enables the entire disk system to "appear" to the computer as an XDS device. This, together with a very minor Telefile installed software modification, insures the double-density disk system is XDS operational software compatible. Even without this software change, the disk system is XDS software transparent and media compatible with single density, 2314-type Telefile disk drives and XDS 7242 Disk Drives.
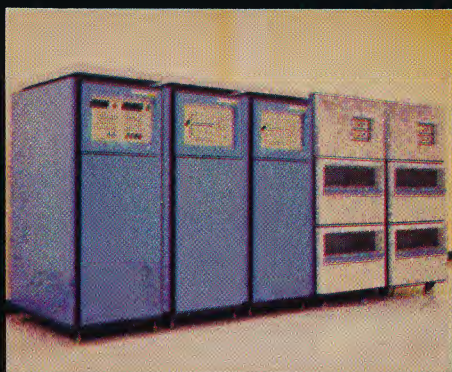
Telefile's TCP-64 Data Communication
System with ASR 33 TTY.

Telefile's DC-32 Disk Controller with the
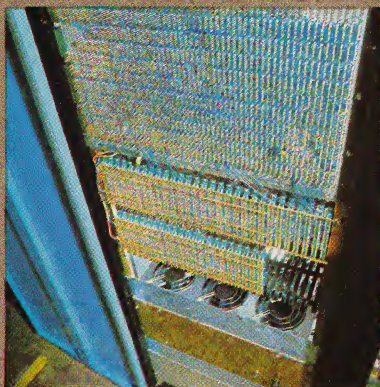two spindle DD-215 Disk Drive Unit.
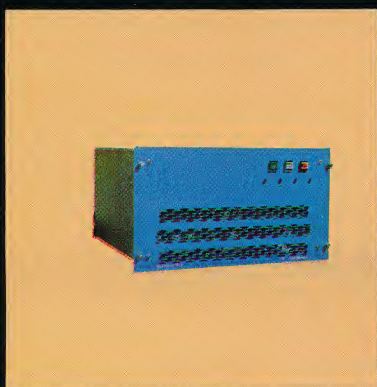
Telefile's DC-16 Disk Controller for
minicomputers.

The Telefile DASU Dual Access Switch
Unit with two DC-32 Controllers
and two DD-215 Disk Drive Units.

To meet the demands for immediate delivery of disk memory systems for our Xerox Sigma customers, we manufacture several of our DC-32 controllers simultaneously.

This Telefile Data Communication System, with its own computer processor easily handles up to 256 lines at varying speeds.
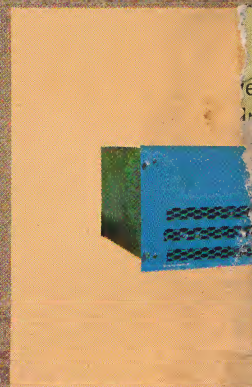
Our pride and joy—the DC-32 controller for the Sigma series computers. The cabinet color and height matches both the Sigma cabinets and the disk cabinets, thus providing an eye-appealing complete system. Two DC-32 controllers are shown here with four quad density DD-225 Disk Drive Unit spindles.

The detail of our designs can best be seen in the wire wrap panel side of the mother board and logic nests of the U-64 Multiplexor/Line Scanner used in our data communication equipment.

Our 19" rack mountable DC-1 for 16 bit minis is used through world with computers manufac Digital Equipment Corporation well, Varian, Data General, Inte Hewlett Packard, and Lockheed others.
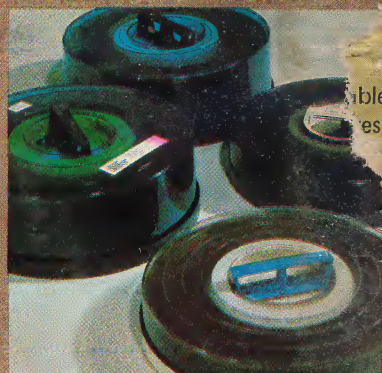

The DC-32 can connect the XDS Sigma computer to both single and double density spindles simultaneously, without the loss of software compatibility. Here the DC-32 is shown with four DD-215 Disk Drive Unit Spindles (double density) and a DD-114 Disk Drive Spindle (single density).

Our Telefile DC-32 controller connects with up to eight single, double, or quad density spindles. Here it is shown with our single-density IBM 2314 Type DD-114 Disk Drive.

Our disk systems accept a variety of removable data storage media, including: 6 high IBM 1316 Type packs; 11 high single, dual, and quad density 2316 Type packs; and 12 high quad density IBM 3336 Type packs.

▷ Telefile